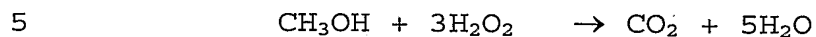
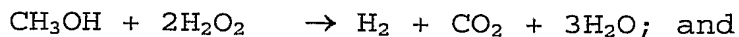
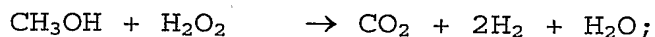
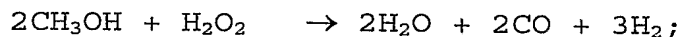


- 17 -

CLAIMS

1. A process for initiating a reaction between methanol and a peroxide to produce a gas, which comprises contacting  
5 methanol and peroxide in the liquid phase and at a pressure equal to, below or above atmospheric pressure in the presence of a catalyst comprising at least one group 7, 8, 9, 10 or 11 transition metal.
- 10 2. A process according to claim 1 wherein the peroxide is hydrogen peroxide or an organic peroxide.
3. A process according to claim 2 wherein the peroxide is hydrogen peroxide and the hydrogen peroxide is in the form  
15 of an aqueous solution, an alcohol solution or urea pellets comprising at least 6 vol% hydrogen peroxide.
4. A process according to any one of the preceding claims wherein the reaction between methanol and peroxide produces  
20 at least one of hydrogen, carbon dioxide, carbon monoxide, methane and oxygen.
5. A process according to any one of the preceding claims wherein the methanol and peroxide are present in a molar  
25 ratio of 2.5:1 to 1:3.
6. A process according to claim 5 wherein the peroxide is hydrogen peroxide and the methanol and hydrogen peroxide are present in a molar ratio of about 1:1.  
30
7. A process according to any one of the claims 2 to 6 wherein the reaction comprises at least one of:

- 18 -



8. A process according to any one of the preceding claims wherein the metal is selected from one or more of nickel, cobalt, copper, silver, iridium, gold, palladium, ruthenium,  
10 rhodium and platinum.

9. A process according to any one of the preceding claims wherein the metal is in metallic form.

15 10. A process according to any one of the preceding claims wherein the catalyst contains one or more catalyst promoters.

11. A process according to any one of the preceding claims  
20 wherein the initiation is carried out without heating the reactants.

12. A process according to any one of the preceding claims wherein the initiation is carried out at a temperature of  
25 less than 80°C.

13. A process according to any one of the claims wherein the initiation is carried out at a temperature of less than 30°C.

- 19 -

14. A process according to claim 13 wherein the initiation is carried out at about room temperature.

15. A process as claimed in any one of the preceding claims which further comprises reforming an organic feed to produce a product stream comprising carbon dioxide, hydrogen and optionally carbon monoxide.

16. A process as claimed in claim 15, wherein the organic feed is selected from an alcohol and a hydrocarbon.

17. A process as claimed in claim 15 or 16, wherein any carbon monoxide produced in the reforming step is converted into carbon dioxide by contacting the product stream with a water gas shift catalyst in the presence of water.

18. A process according to any one of the preceding claims which is carried out in a fuel cell, to power a rocket or to inflate an air bag, to pressurise mechanical equipment or for the quick start up of a catalytic exhausted gas converter or NO<sub>x</sub> purifier.

19. An apparatus for carrying out a reforming reaction, said apparatus comprising  
storage means containing methanol and peroxide,  
a housing containing a catalyst comprising at least one group 7, 8, 9, 10 or 11 transition metal, and  
means for introducing the methanol and the peroxide into the housing.

30

20. An apparatus as claimed in claim 19, wherein the housing additionally contains a water gas shift catalyst

- 20 -

located downstream of the catalyst comprising at least one group 7, 8, 9, 10 or 11 transition metal.

21. An apparatus as claimed in claim 19 or 20, which  
5 further comprises a fuel cell downstream of the housing and means for transferring any hydrogen produced in the housing to the fuel cell.